



**ASCO** Power Technologies™

## Case Study:

Microgrid for a Children's Home  
Puerto Rico, USA

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## Case Study:

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### PROBLEM

Located on a rural mountain top in Puerto Rico, [Hogar Albergue para Niños Jesús de Nazaret](#) serves as a home and school for neglected children up to 11 years of age. Before 2017, the staff and children there had routinely experienced power outages following storms. After Hurricane Maria, the facility was without power for months. The children's home needed a power solution that accounted for the site's frequent lengthy outages and offered long-term reliability. [Engineers Without Borders](#) responded to make reliable power a reality.

### SOLUTION

*Engineers without Borders* worked with its [student chapter at the University of Wisconsin – Madison](#) and turned to [Affiliated Engineers, Inc. \(AEI\)](#) of Madison, Wisconsin, USA for solutions. Together, they designed a microgrid power system that could be supplied by the normal utility source, or operate independently using an on-site generator, photovoltaic panels, and storage batteries. To make the system work, it would need inverters to convert stored energy from batteries to ac when backup power was needed during utility outages. To connect to backup power, the system would also need one transfer switch to transfer building load between the utility and emergency power sources, and another transfer switch to select between stored power in batteries or the facility's diesel generator.

The facility would normally operate on utility and solar power. While doing so, solar cells would charge lithium-ion storage batteries to capacity. During utility outages, the primary transfer switch transfers load to the solar/battery system, and the secondary transfer switch remains connected to the solar/ battery system. If they become depleted, the secondary transfer switch starts the engine and transfers load to the emergency generator. When utility power is restored, the transfer switches return all of the power devices to their normal operating state.



**Student members of Engineers Without Borders worked to bring a reliable power solution to a children's shelter in Puerto Rico, USA.**



**Solar panels charge batteries to store renewable backup power. A generator located between the buildings is used for extended outages.**

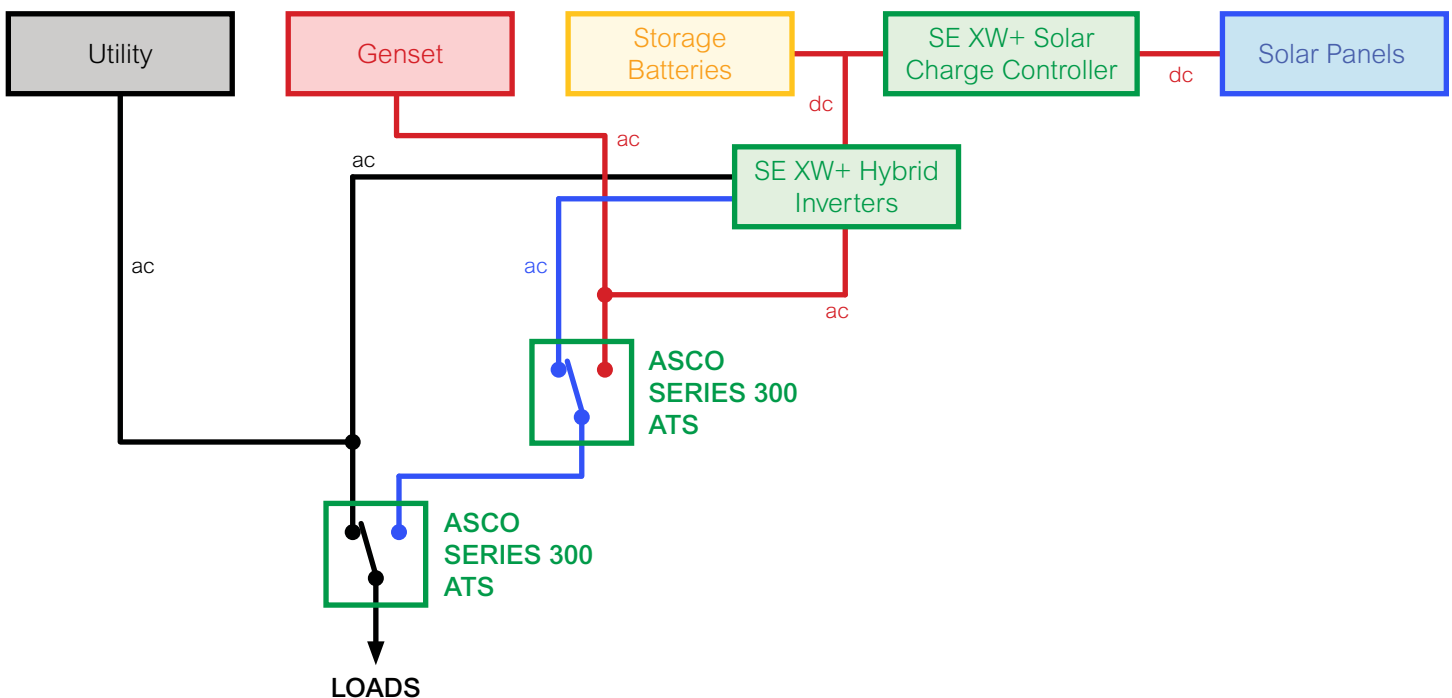
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To complete the project, the team specified the following equipment to supply backup power to the 120/240V 24.6 kW ac power distribution system:

- 96 Hanwha Q+ 340 Watt photovoltaic panels
- Four Blue Ion 2.0 50 Vdc lithium-ion storage batteries, rated 16 kWh each
- Two 6.8 kW and two 5.5 kW Context XW+ Inverters from Schneider Electric
- Two 200 Amp SERIES 300 Open Transition Automatic Transfer Switches (ATS), donated by ASCO Power Technologies

A conceptual sketch of the system is shown as follows.



## THE OUTCOME

The project team began work in 2018, and the microgrid equipment was installed and ready for startup in the Autumn of 2020. Installation, startup, and commissioning services were provided by an independent electrical contractor. The system began service without significant technical problems or delays.

"Implementing this project remotely with an all-volunteer team was both challenging and extremely rewarding, says Alberto G. Cordero, PE – EWB Mentor and Electrical Engineer at AEI. "Not only was an innovative design implemented between the inverters and two-ATS combination, but the collaborative spirit of all the professionals and students was inspiring and an example to follow. The Hogar's staff and children report nothing but many thanks and appreciation, and are delighted to have been selected for this project."

Today, the shelter's power system provides reliable backup power whenever needed. With this solution, the facility can run for up to 12 hours on stored energy from a renewable source, and can run on a diesel generator for extended outages. The facility is now more resilient to extreme weather events, including the seasonal hurricanes that affect its region.



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**ASCO Automatic Transfer Switches, Schneider Electric Inverters, and Blue Ion lithium-ion batteries manage and store backup power for the shelter.**

Since commissioning, the children and staff at *Hogar Albergue para Niños Jesús de Nazareth* have learned the benefits of having reliable, economical, and eco-friendly power. ASCO Power Technologies is privileged to have been part of a solution that keeps children thriving and learning.

### TEAM:

- Client: [Hogar Albergue para Niños Jesús de Nazaret](#), Mayagüez, PR, USA
- Design and Project Management: [Engineers without Borders](#) – University of Wisconsin – Madison
- Project Oversight: [Affiliated Engineers](#) of Madison, Wisconsin, USA
- Local Engineering: [AZ Engineering](#); Angel Zayas, PE; Carolina, PR, USA
- Contractor: [Renewable Solutions Engineering](#); Ernesto Rivera, PE; Mayagüez, PR, USA
- Batteries: [Blue Planet Energy](#), Honolulu, HI, USA
- Inverters: [Schneider Electric](#), Grenoble, FR
- Transfer Switches: [ASCO Power Technologies, Inc.](#), Florham Park, NJ, USA

For more information, please contact [Larry Grodsky](#), Marketing Director for [ASCO Power Technologies](#).





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